



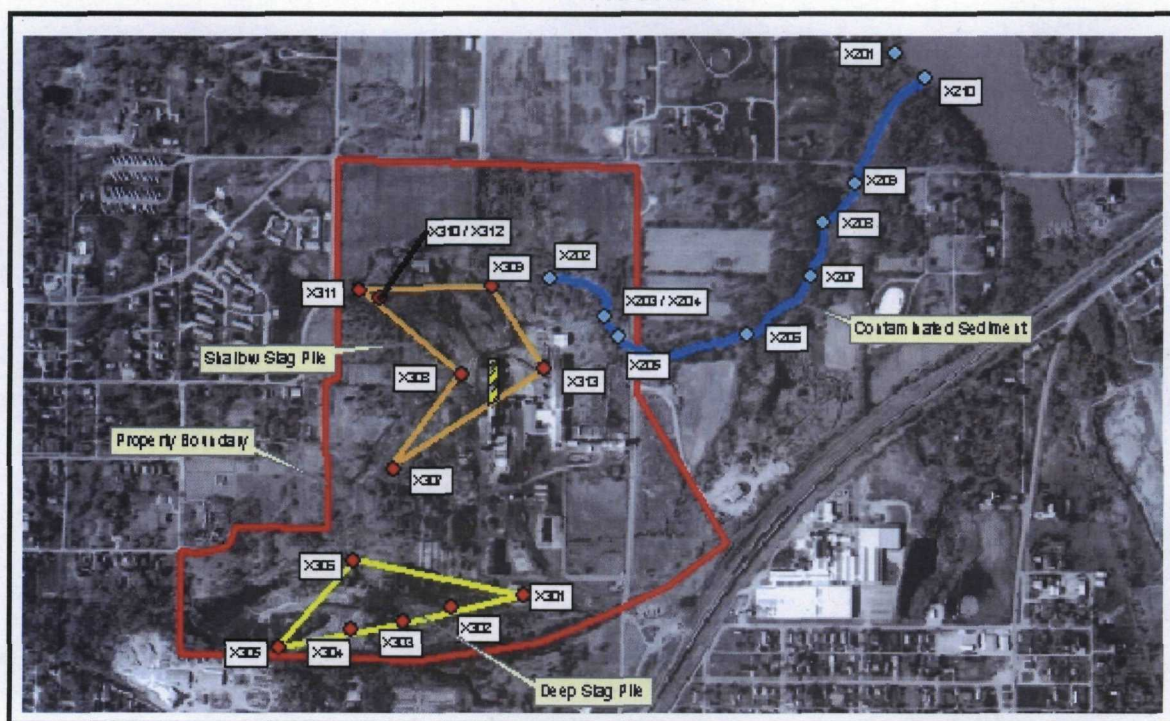
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## MEMORANDUM

**DATE:** November 29, 2005  
**TO:** Division File  
**FROM:** Bob Casper  
**SUBJECT:** GIS Memo to File  
**SITE NUMBER:** L1358070001 - Montgomery  
Eagle Zinc Company  
ILD 980606941  
SF/HRS

A desktop Geographic Information System (GIS) was used to aid in calculations for size and volume of the Eagle Zinc Company site and associated source sizes, distances to populations, and populations in certain areas. Sample location data was collected using the Illinois EPA, Bureau of Land, Trimble Pro XR Global Positioning System (GPS). Data from the GPS were overlain on aerial photographs and georeferenced topographical maps using the computer program ArcGIS produced by ESRI. A script was used within ArcGIS to calculate the area (in square meters) of contamination for each of the sources. Figure 1 below shows each source (Slag Pile, Shallow Slag Pile, Contaminated Sediment) identified at the Eagle Zinc Company Site and approximate site boundaries. Selected sample locations are included in Figure 1 and were used for the determination of aerial extent of contamination for the Slag Pile, Shallow Slag Pile and Contaminated Sediment. The notes and calculations for determining source volumes and populations in certain areas are provided below.

FIGURE 1



Bob Casper, IEPA

**Source:** Illinois Department of Natural Resources Geospatial Data Clearinghouse: Digital Orthophoto quarter Quadrangle, Montgomery, County, Southwest quarter of Hillsboro quadrangle. In: Illinois Natural Resources Geospatial Data Clearinghouse at <http://www.isgs.uiuc.edu/insdihome/ISGSindex.html>.

## **AREA AND VOLUME CALCULATIONS AND PRESCORE NOTES FOR SOURCES**

### **Deep Slag Pile**

The area encompassed by the deep slag pile was determined by examination of the aerial photo in ArcGIS. A polygon was created in ArcGIS by connecting sample points X301 – X302 - X303 - X305 - X306 – X301 of the slag pile, and saved in a shapefile format. The resulting polygon is shown on Figure 1. The area inside the Deep Slag Pile polygon, as determined using a script in ArcGIS, is 28,480.9 m<sup>2</sup> (306,562 ft<sup>2</sup>). Although volume of the slag in the waste pile can be roughly estimated by taking a number of elevation readings across the pile and computing an average and multiplying by the base area, the area between sampling points was used for HRS scoring purposes.

Six waste samples (X301, X302, X303, X304, X305 and X306) were obtained from the slag pile during the 2005 Expanded Site Inspection Addendum. Integrated Assessment (Ref. 3, p. 9, 10). The highest concentrations of arsenic, cadmium, chromium, copper, lead and zinc identified in the Slag Pile were 158, 152, 169, 3,280, 36,500 and 391,000 ppm, respectively (Ref. 2, p. 114 - 119). The highest zinc concentration in the Slag Pile was 391,000 ppm, reported at X302 (Ref. 2, p. 115).

### **Shallow Slag Pile**

The area encompassed by the Shallow Slag Pile was determined by connecting locations of waste samples from the 2005 Expanded Site Inspection Addendum that met the following criteria: the sample contained slag; the sample was obtained in an area with spread slag; and, the sample had elevated concentrations of several metals. The sample locations that most accurately represent the aerial extent of shallow slag are, starting at the southeastern sample and working clockwise: X307 - X308 - X311 - X309 - X313 - X307. A polygon was created in ArcGIS, connecting sampling locations and was saved as a shapefile. The resulting polygon is shown on Figure 1. The area inside the polygon, as determined using a script in ArcGIS, is 444,964.41 ft<sup>2</sup>. The total square feet for the building is 14,337.59 ft<sup>2</sup>. The building was subtracted from the total square feet for a total of 430,626.8 ft<sup>2</sup>. All of the samples representing the aerial extent of the polygon were obtained from 0 – 1/2 inches below ground surface (Ref. 3, p. 10 - 12). A waste depth of 1/2 inch can be used to calculate a waste volume, which when multiplied by the area, results in a waste volume of 664.5 yd<sup>3</sup>. However, rather than attempting to document the assumption that the shallow waste pile was 1/2 inch deep throughout the source, the area inside sampling points of the pile was used for calculations in the HRS scoring package. The highest concentrations of arsenic, cadmium, chromium, copper, lead and zinc from samples X307, X308, X311, X309 and X313 were 175, 152, 1,620, 33,100, 29,100 and 407,000 ppm, respectively (Ref. 3, p. 120 - 126).

### **Contaminated Sediment**

The extent of Contaminated Sediment was determined by connecting locations of sediment samples from the 2005 Expanded Site Inspection Addendum that met observed contamination criteria for one or more contaminants. The sample locations best representing the area of contamination are, from the west to northeast, X202, X203/X204, X205, X206, X207, X208, X209 and X210 (Ref. 3, p. 14 – 19, 23). A polygon was not created by connecting sample locations since the samples were collected from a small stream and the lateral extent of contamination on each side of the stream in the floodplain was not determined. The distance from the onsite sediment contamination to the Probable Point of Entry into Lake Hillsboro is 1021.73 meters (3,352.3 ft.). The floodplain along most of the drainage pathway is broad. In order to be conservative, for HRS scoring purposes, the area considered for the source waste quantity was considered to be "greater than zero ft<sup>2</sup>". The highest values identified in laboratory samples from the Contaminated Source Area for arsenic, cadmium, copper, lead, manganese and zinc at 26.4, 16.1, 297, 769, 3,640 and 31,300 parts per million (ppm) (Ref. 2, p. 130, 174, 132, 130 ).

*Bob Casper, IEPA*

## References

1. Unites States Environmental Protection Agency. Using Qualified Data to Document an Observed Release and Observed Contamination. Office of Emergency and Remedial Response. EPA 540-F-94-028, OSWER 9285.7-14FS, PB94-963311. November 1996.
2. Illinois Environmental Protection Agency (Illinois EPA). CERCLA Expanded Site Inspection Addendum Report – Eagle Zinc Company, ILD 980606941. September 1, 2005. 375 Pages.
3. Casper, Robert L. Illinois Environmental Protection Agency. Field Log Book. April 25 – April 28, 2005. 28 pages.

*Bob Casper, IEPA*